

WHAT IS CLAIMED IS:

1. A method for responding to a transient output voltage in a multiphase switching regulator, the method comprising:

comparing an output voltage with a plurality of reference voltages to generate a plurality of control voltages for respective phases of a multiphase switching regulator;

detecting changes in output current;

generating at least one inject signal when the output current changes by more than a predetermined amount within a predefined duration; and

overriding at least one of the control voltages with the inject signal to operate at least one of the phases at a predetermined duty cycle during an output voltage transient.

2. The method of Claim 1, wherein the reference voltages are feedback voltages from the respective phases and are used to control current sharing between the phases.

3. The method of Claim 1, wherein changes in the output current are detected by sensing undershoots or overshoots in the output voltage.

4. The method of Claim 1, wherein the multiphase switching regulator accepts one or more direct current voltage sources and outputs a desired direct current voltage to power a microprocessor.

5. A method of responding quickly to output transients for a multiphase switching regulator comprising:

comparing an output voltage of the multiphase switching regulator to a reference comparing voltage;

providing a reduced-load signal to turn on a first semiconductor switch in a dedicated phase of the multiphase switching regulator to drain a portion of the output current when the output voltage is greater than the reference comparing voltage; and

providing an increased-load signal to turn on a second semiconductor switch in the dedicated phase of the multiphase switching regulator to provide additional output current when the output voltage is less than the reference comparing voltage.

6. The method of Claim 5, wherein the dedicated phase uses an inductor of a smaller value than corresponding inductors of the other phases in the multiphase switching regulator.

7. The method of Claim 5, wherein the reference comparing voltage corresponds to a steady-state operating output voltage of the multiphase switching regulator.

8. The method of Claim 7, wherein the reference comparing voltage automatically updates to reflect a new operating output voltage.

9. The method of Claim 5, wherein a pulse-width modulation circuit normally controls switching operations of the multiphase switching regulator.

10. A switching regulator comprising:

means for bypassing a feedback circuit of the switching regulator in response to an overshoot in an output voltage of the switching regulator by operating the switching regulator at a first predetermined duty cycle; and

means for alternately bypassing the feedback circuit in response to an undershoot in the output voltage of the switching regulator by operating the switching regulator at a second predetermined duty cycle.